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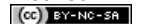
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(/member/DrewPaulDesig
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(http://DrewPaulDesigns.com)

(/member/DrewPaulDesigns/272

Bio: I am a tech maniac; from media, marketing and design to alternative energy and more. Check out my website for links to all my projects.

More by DrewPaulDesigns:



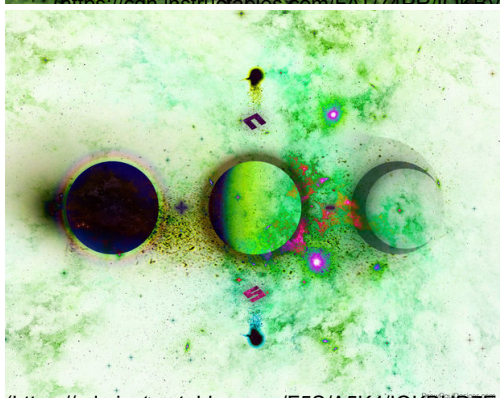
(/id/TRIPLE-YOUR-SOLAR-ARRAYS-OUTPUT/)



(/id/Free-Energy-From-Thin-Air/)



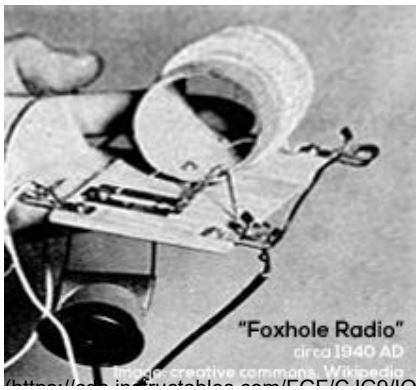
(/id/DIY-Electro-Magnetic-Levitation/)



"Dendera Light"

circa 1500 BC

Image: creative commons, Wikipedia



"Free energy from the air?, Yea, right!" Sardonic skepticism was my first reaction to this unusual concept, as well.

Though, its not so far out there, in fact. Light can be converted to DC current with solar panels, electricity can be converted to magnetism as I did in my last article (<https://www.instructables.com/id/DIY-Electro-Magnetic-Levitation/>), in a microphone sound waves are converted to an electrical signal (by vibrating a magnet near a coil (<http://hyperphysics.phy-astr.gsu.edu/hbase/audio/mic.html>)), solar rays can even be focused and converted to heat in awesome devices like this! (<http://www.gosunstove.com/>) When we think about it, energy is all around us and can be harvested in an enumerable many of ways.

Today, we are going to take a rather novel approach. We are going to build a device specifically designed to sense and capture a particular band of energy which is all around us.

The earth is magnetic and anyone who has ever used a compass knows this. Magnetic bodies in motion produce electricity, we can see this in any alternator, like the one in your car. So, therefore the earth is electric as well as magnetic, by definition.

Can we detect this energy? Yes, we sure can! Ever turn on a radio in the middle of nowhere and heard static? That is your radio picking up naturally occurring energy in the RF spectrum!

Can we use this energy to do work? Absolutely! This has been known for a long time. Crystal radios (https://en.wikipedia.org/wiki/Crystal_radio) have been around since before the 1930's and can run with no input energy other than the radio signal. Even when completely isolated, but from the atmosphere, a crystal radio will produce a voltage in the earpiece resulting in a sound (albeit and undesirable one).

Well, this is where it gets interesting...

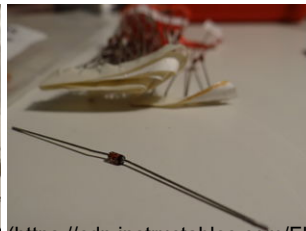
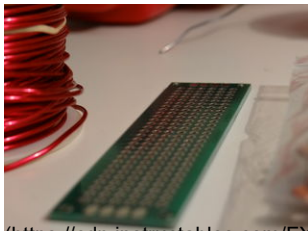
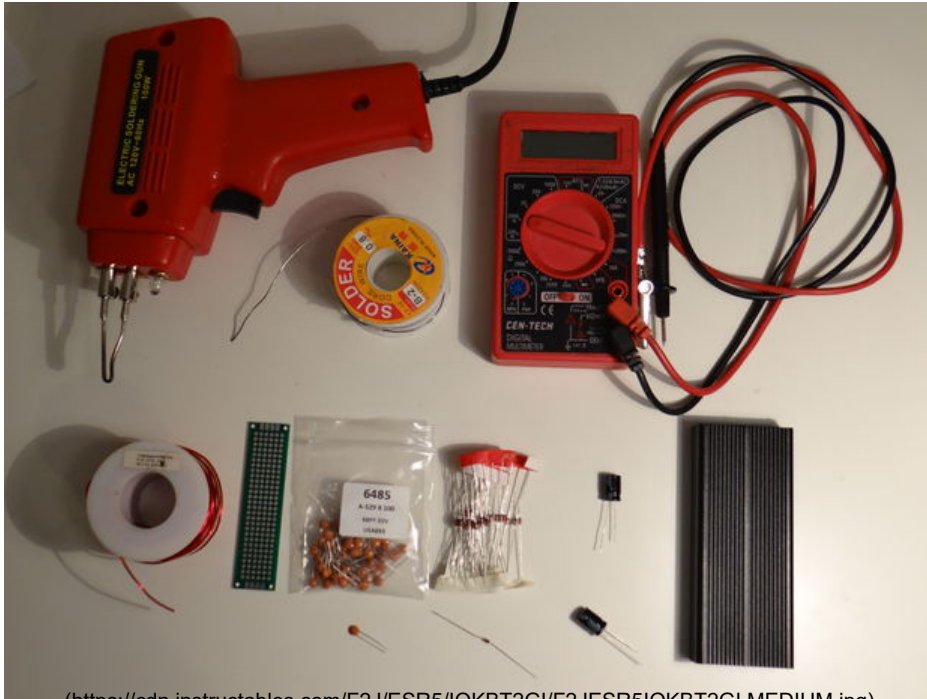
Can we replicate this effect? Yea, and with modern components like the high quality crystals found in germanium diodes, we can even increase efficiency. By applying this concept as a Crystal Energy Receiver we can take advantage of a wide range of energetic frequencies rather than tuning in to just one.

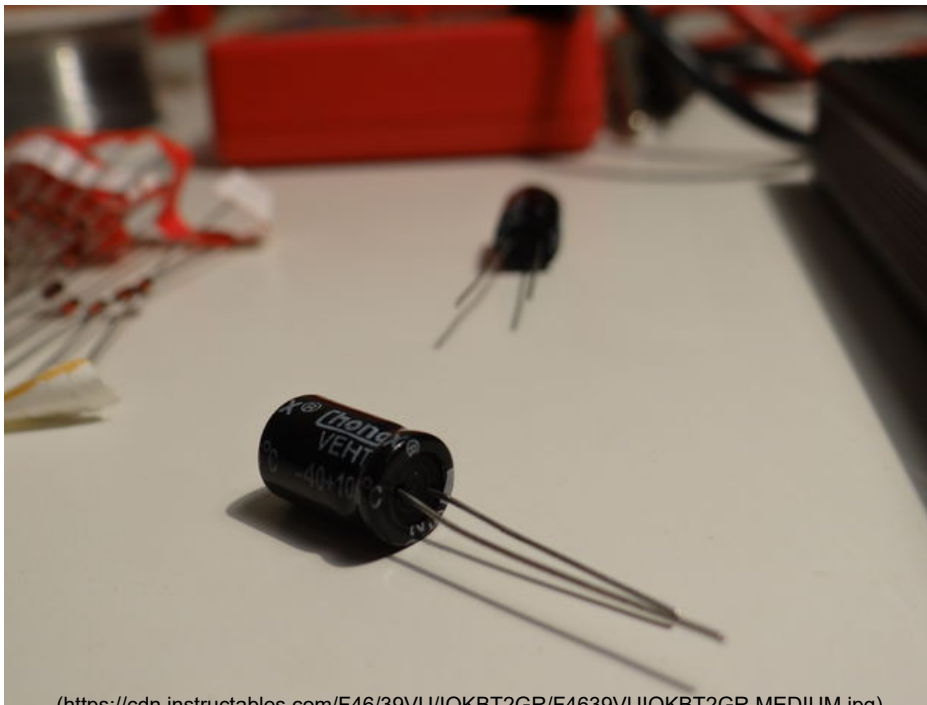
Can we scale it up? Definitely. Things like micro germanium diodes, high efficiency antennas and compact contemporary capacitors make the components that are required to build a crystal receiver fit in the palm of your hand. While there may or may not be a more efficient way, this renewable

energy solution is simple to employ and can be scaled up, or down, indefinitely.

It sounds like we can build a Crystal Energy Receiver. Let's give it a shot...

Step 1: What You'll Need





(<https://cdn.instructables.com/E46/30V4/11QKBT2CP/E4630V4/11QKBT2CP-MEDIUM.jpg>)



(<https://cdn.instructables.com/EKY/5NKO/1QKBT2CL/EKY5NKO/1QKBT2CL-MEDIUM.jpg>)



One of the reasons this particular renewable energy harvesting method is so viable is the relatively few and easy to obtain materials required.

The simplest crystal receiver design needs no power and can be built with only three parts: a coil, a crystal and a resistor. We're going to optimize that design in order to produce a cleaner and more reliable output signal by first polarizing the input amplitude, then rectifying and filtering the signal. Then we'll add an antenna, case and connections.

Get the circuit diagram here (<http://www.drewpauldesigns.com/crystal-energy-receiver-kit.html>)

Get the kit here (<http://www.drewpauldesigns.com/crystal-energy-receiver-kit.html>)

The parts for the circuit include:

(1) Circuit Board (<http://www.drewpauldesigns.com/crystal-energy-receiver-kit.html>)

(1) 10-18 gauge Copper Wire

(2-12+) Ceramic Capacitors (matched)

(2-6+) Electrolytic Capacitors (matched)

*note various types of capacitors can be used

(4) Germanium Crystal Diodes (1A+)

Total Unit Cost: +/- \$0.40 (USD, scaled for volume of 1,000+ units)

In addition, you'll probably want to get:

(1) Project box (optional)

(1) Antenna (a loop antenna or elevated antenna is recommended and can be made with copper wire)

The tools you'll need are:

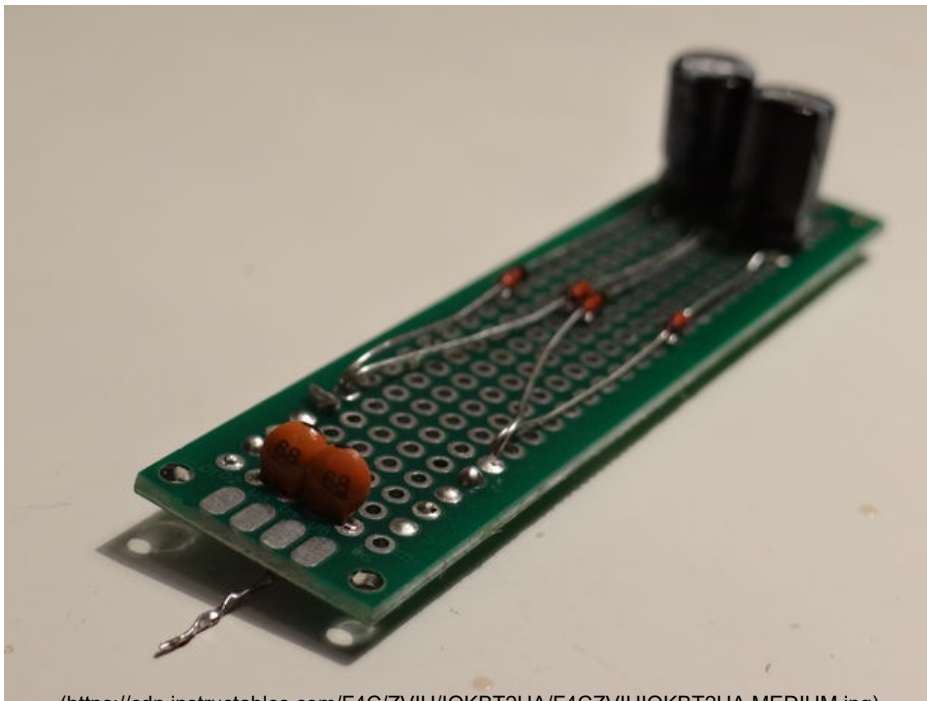
Soldering Iron/ Solder (optional)

Multimeter

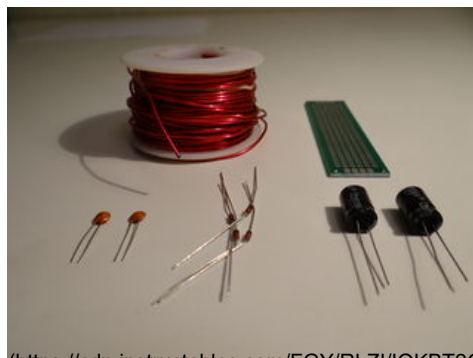
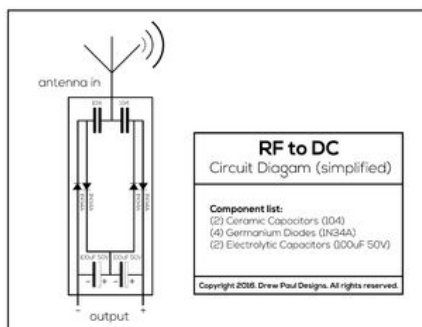
Oscilloscope (http://www.seeedstudio.com/depot/DSO-Nano-v3-p-1358.html?cPath=63_65) (optional)

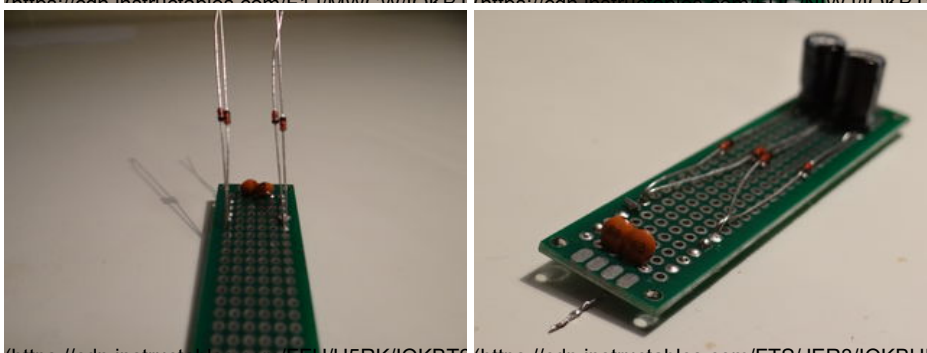
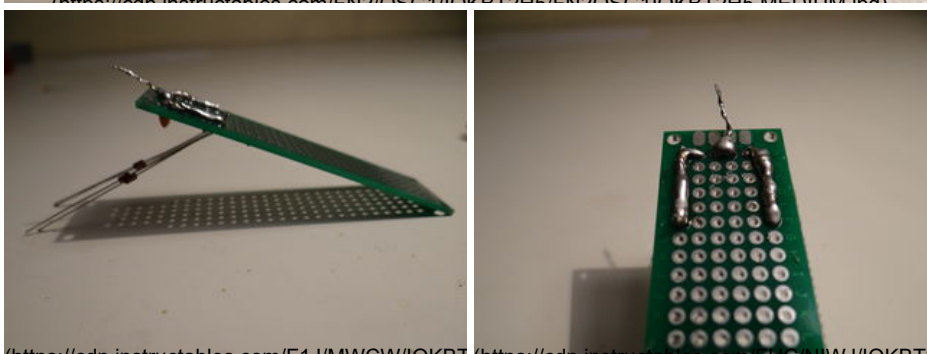
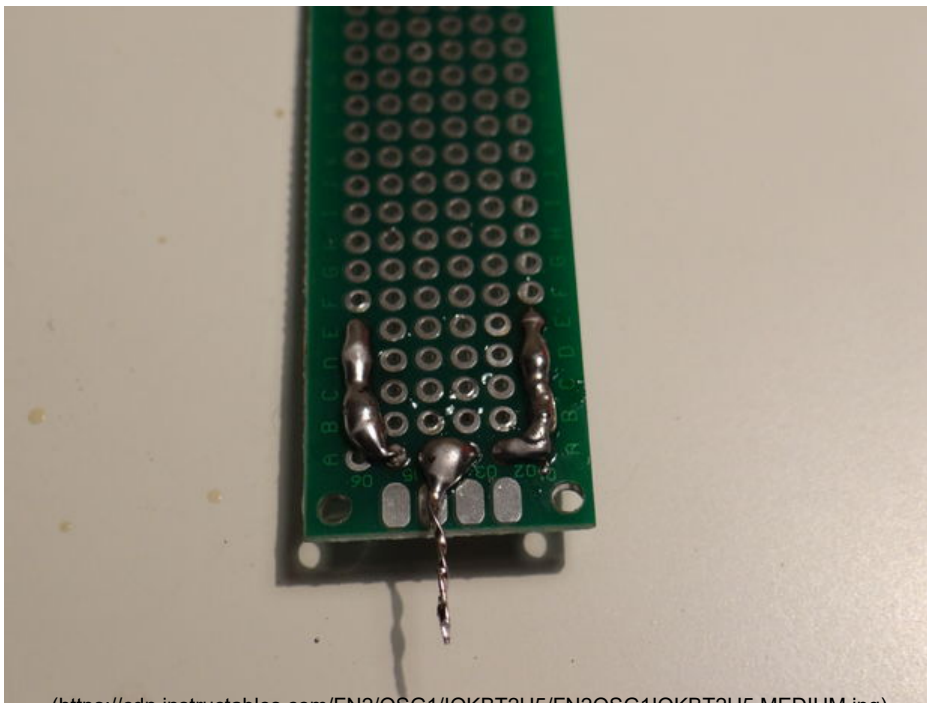
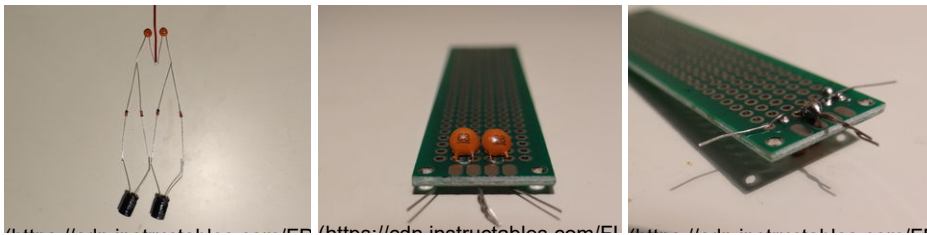
That's it. Yup, that's all. Once we've got it all, let's begin.

Step 2: Build the Circuit



A





A

We're going to build the simplest version of this circuit variation in order to understand how each component interacts and as a proof of concept.

There are three simple systems at work in the circuit that are composed of capacitors, which store energy, and diodes that direct it.

Energy in the band of radio waves, among others, will vibrate a wire antenna on an atomic level, sending a discernible signal to its lead. This signal will then

meet the junction between two ceramic capacitors wired in series. This junction will force positive charge from the wave to travel in one direction and negative charge in the other direction which, when collected again, makes the signal uniform and polar. Connecting the two capacitors in series creates leads on each end; the now positively charged side of one and the now negatively charged side of the other creates a two cell battery.

This next stage of the circuit takes a signal with a net value of zero, adds the absolute values of the positive and negative amplitudes with respect to the origin and produces a positive integer. This concept can be thought of as taking:

$$(+1) + (-1) + (+1) + (-1) = 0$$

and converting it to:

$$\begin{aligned} &|[(+1) + (+1)]| = 2 \\ &+ \\ &| [(-1) + (-1)] | = 2 \\ &= 4 \end{aligned}$$

Isn't math fun?

To each of these leads from our two capacitors in series, we will connect two crystal diodes, one facing each direction, to form what is called a bridge rectifier. A bridge rectifier is a configuration which will convert an alternating current to a direct one by cleverly rerouting the signal.

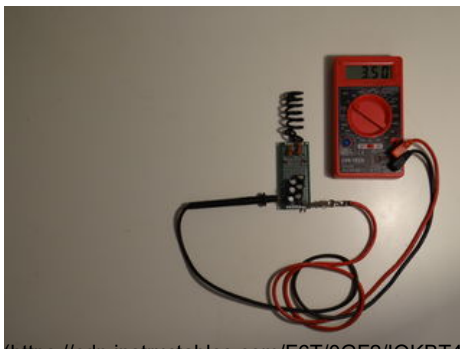
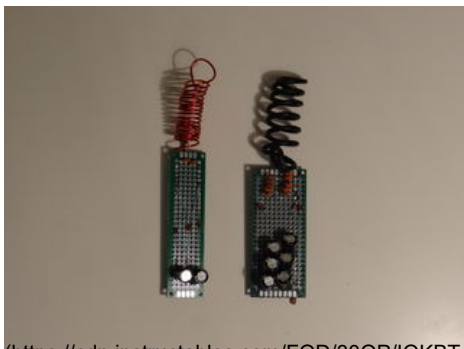
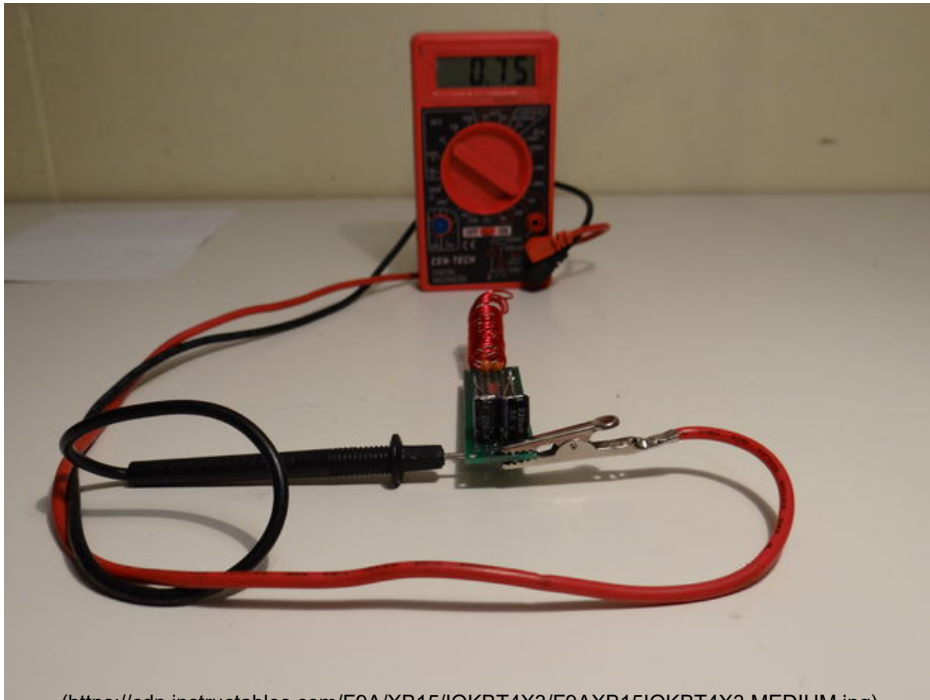
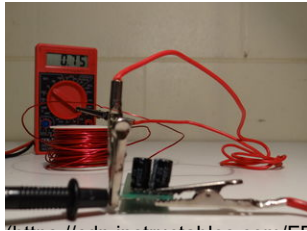
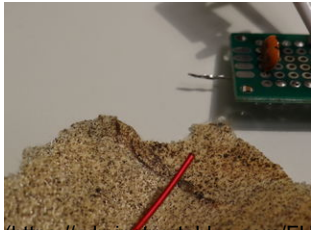
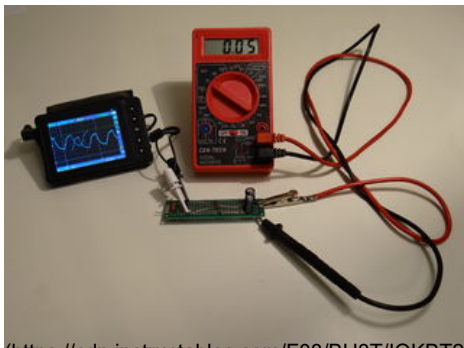
By connecting the bridge rectifier as shown in the circuit diagram, this direct current from the diodes then charges the electrolytic capacitors. This stage normalizes the amplitude, making the current constant and usable.

Components can easily be twisted together for testing and then soldered to a circuit board to secure.



Step 3: Test and Optimize Your Circuit





To test and analyze our circuit, we'll be using a digital voltmeter and oscilloscope.

By connecting a voltmeter to the output, we'll immediately begin to see a small voltage climbing in the 10-100mV range. If not, we'll want to check our connections and make sure the circuit is not isolated from the environment by taking it outside to a clear area.

Then, by connecting an oscilloscope to the outside leads of our two ceramic capacitor bank, we will see the the polarized signal being captured from the air around us. We can then connect after the diodes to see our varying direct current and then to after the electrolytic capacitors to see a normalized, usable direct current at our output.

We can then optimize the input resistance in two ways. Firstly, we can add additional ceramic capacitors in parallel to our original two and make sure our soldered connections are consistent and thick in this area.

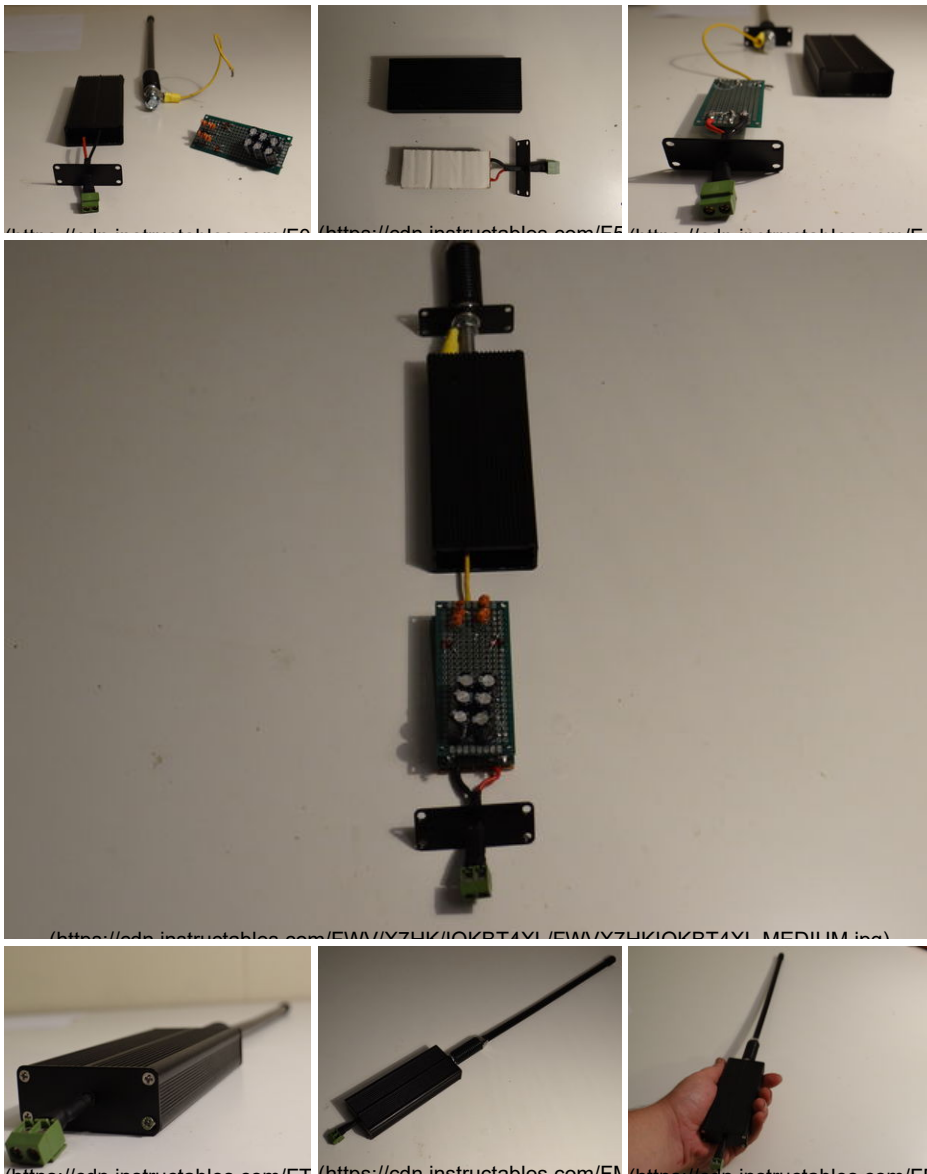
We can optimize the circuit's capacity by adding electrolytic capacitors in parallel to our original two which will allow this circuit to charge slightly when not in use. For this purpose, a charging circuit can also be added here in order to incorporate an optional battery bank.

We can optimize the antenna by attaching loops and coils of copper wire in various positions, store-bought antennas or by stringing some wire up to the highest point you can reach.

We don't have to stop there, either. We can now connect multiple circuits in series to increase voltage or in parallel to increase current. This can be done indefinitely.

Step 4: Add a Case and Antenna



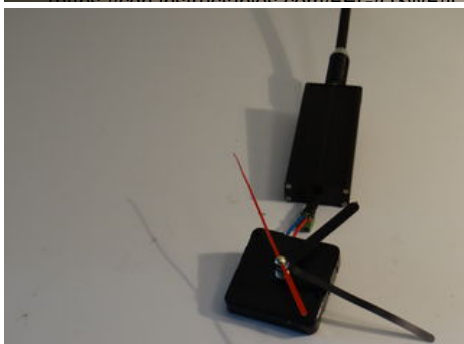
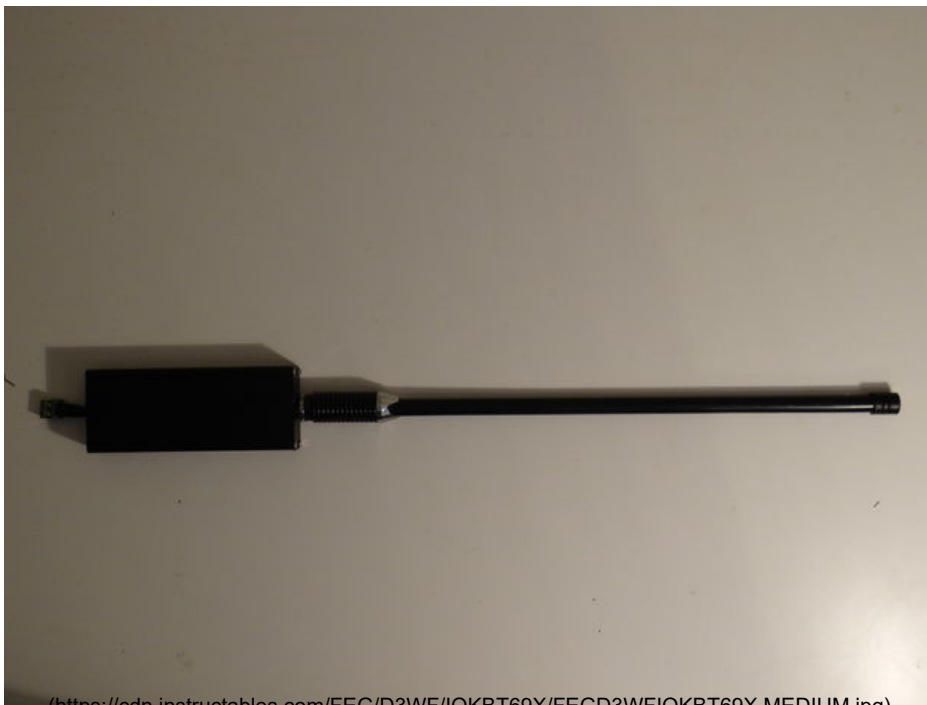


After choosing an antenna in the last step we'll now want to permanently wire it. Whether you choose a compact antenna for portability or a tall fixed antenna for power and range, we will wire it in the same manner according to the diagram in the previous step. Note that the input on the configuration here is grounded to the metallic case, and thus the users hand, and incorporation of longer antennas will require proportionally more substantial grounding.

We will then attach a terminal to the output to allow us to connect this circuit to an electrical device or charging circuit and battery bank.

Next, we will add a case, making sure to isolate exposed leads with non-conductive material especially if mounting in a conductive case. A piece of cardboard secured with glue is sufficient for the circuit's bottom and shrink wrap or electrical tape can be used in the case of any additional exposed leads. Drill two holes in your enclosure, one for the antenna or antenna lead and another for your output terminals. You can then insert your components, fasten the enclosure and your device is ready to use!

Step 5: Your Crystal Energy Receiver Is Complete!



A

Your Crystal Energy Receiver is now complete and ready to use!

I built a portable version, for proof of concept and demonstration purposes. However, you can go as big as you want- to passively charge batteries or run equipment remotely; or go as small as you want- to power sensors, RFID devices, small electronics and more.

I used this harvested energy to easily power a low-consumption quartz clock, a digital chronograph with integrated circuits and LCD and was even able to momentarily rotate a small dc motor.

Because of its simplicity this device is a durable, efficient and reasonably effective method of harvesting radiant energy in a simple, replicable and sustainable way. I humbly hope that the contributions made here, and by those


reading, can be one day used by people worldwide to conveniently capture free energy.


Thanks for checking out my project and I look forward to seeing everyone's variations, suggestions and improvements!


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Comments



 We have a be nice comment policy. Please be positive and constructive.

 I Made it!

 Add Images

Post Comment



TzefaiO (/member/TzefaiO/)

2017-09-30

Reply

Can you ship to Hong Kong when I bought it? How can I contact you?



VinyasiQ (/member/VinyasiQ/)

2017-08-30

Reply

<http://is.gd/battchar2>

<http://is.gd/portablebatterycharger>



Dornier (/member/Dornier/)

2017-07-29

Reply

- 1: what rating capacitors (ceramic)?
- 2: what rating capacitor (electrolytic)?
3. why both types of capacitors and not one type?
4. You've mentioned grounding to earth, but where is the grounding line?
5. Looking to make this a kids' project to charge a phone so expanding these size isn't a problem at all.



DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ Dornier (/member/Dornier/)

2017-07-29

Reply

Thanks for checking out my project. A lot of these questions are covered in the Instructable but I will answer them briefly for you.

The ceramic capacitors used are 104s and their purpose is to polarize the charge. Electrolytic caps are 50v rated and are used to hold the charge in order to provide a usable current. In this example the ground is connected to the case, and thus grounded through the users hand. Scaling this up for that purpose will require a more significant antennae, ground and wiring up multiple circuits in series which is covered in more detail in the article. Let me know if you have any other questions and be sure to post your project pictures here when you're done for everyone to see!

Loveforcats (/member/Loveforcats/)

2017-07-17

Reply

Hey,how much maximum voltage can be obtained at the output by adiiing capacitors in parallel.....????

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ Loveforcats

(/member/Loveforcats/)

2017-07-17

Reply

Thanks for checking out the project. Great question. Adding capacitors will only increase the capacity (mAh). If you want to increase voltage you can build multiple circuits in parallel and make sure your antennae is as tall as possible.

Loveforcats (/member/Loveforcats/) ▶ DrewPaulDesigns

(/member/DrewPaulDesigns/)

2017-07-26

Reply

I dont want to place my antenna on roof top.I want a min of 5 volt and max of 20 volts and a portable circuit.So what shud i add to the circuit for getting it.??? and what kind of antenna shud i make..??



Loveforcats (/member/Loveforcats/) ▶ Loveforcats (/member/Loveforcats/)

Reply

2017-07-26

Can u please send me a video of how your project is working..??

Loveforcats (/member/Loveforcats/) ▶ Loveforcats (/member/Loveforcats/)

Reply

2017-07-17

adding*

galihprog (/member/galihprog/)

2017-07-14

Reply

sir, why the first kit show value 0.75v and the second kit show value 3.50v, what is different make? (coil turn, coil component, total component, etc..)

Raghdado (/member/Raghdado/)

2017-07-04

Reply

What a nice instructable! But I have few questions though, if you don't mind.
How long did it take you to complete the project?
How much did it cost you?
Would it be realizable for the duration of one month only (for a beginner)?
And most of all, Could you tell me about the output (after testing)?

Thank you :)

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ Raghdado (/member/Raghdado/)

Thank for checking out my instructable! This project
can be done in an afternoon and the kit can be found here:
<http://www.drewpauldesigns.com/crystal-energy-receiver-kit.html>

2017-07-04

Reply

Before getting started you will also want to get a soldering iron and take
some time to practice with it.

Just follow the instructable carefully and you will have no problem.

You can get everything you need here:
<http://www.drewpauldesigns.com/crystal-energy-receiver-kit.html>

Raghdado (/member/Raghdado/) ▶ DrewPaulDesigns (/member/DrewPaulDesigns/)

Thank you, I can't wait to start it :)

2017-07-04

Reply

But before, I just want to know the testing result (voltage, current...)

alaafprojs (/member/alaafprojs/)

2017-01-22

Reply

Cool :-)

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ alaafprojs (/member/alaafprojs/)

So cool, right? Give it a try! Its easy, fun and the results
are astounding!

2017-01-22

Reply



alaafprojs (/member/alaafprojs/) ▶ DrewPaulDesigns (/member/DrewPaulDesigns/)

The problem is I don't have any germanium diodes

2017-05-30

Reply

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ alaafprojs (/member/alaafprojs/)

You can get the kit here:

2017-05-30

Reply

<http://www.drewpauldesigns.com/crystal-energy-receiver-kit.html>

alaafprojs (/member/alaafprojs/) ▶ DrewPaulDesigns (/member/DrewPaulDesigns/)

Yes, I know.

2017-06-01

Reply

But I just got some germanium diodes and I have all of the other parts

alaafprojs (/member/alaafprojs/) ▶ alaafprojs (/member/alaafprojs/)

Reply

I just made it and I tried it with germanium diodes and 1N4001
diodes and the 1N4001 diodes worked better

2017-06-01

PS: I have found some other circuits that work better

Raghdado (/member/Raghdado/) ▶ [alaafprojs \(/member/alaafprojs/\)](#)

Reply

Could you please post the image or the link of the other circuits that work better ?

2017-07-03

frisbrob (/member/frisbrob/)

2017-03-30

Reply

I am always looking for ways to generate power, mostly because it's fun but most of our renewable energies have their down sides. Solar only works while it's day time, wind only works while there is wind. I don't know about where you live but here in Sandy Utah there is no sun at night and at night during winter or summer there is no wind at night, so that takes care of generating power at night. I have looked at several of these pulling power out of the air things, I have even looked at finding Tesla's plans and there is nothing usable. I don't know how to do the math to figure out what parts are needed to build these diy collectors and generators. To me it sounds like you would need an entire back yard to hold anything big enough to do any good, most of the things people build might charge a cell phone but that's about it. If I was to build this unit but big enough to constantly run an 800 watt unit, how big would the antenna need to be and what parts would I need? Just curious.

medicinet1 (/member/medicinet1/)

2017-03-26

Reply

Free Energy Generators

medicine turtle cherokee it a great ideal

<http://www.hal-lo.at/>

PhillipH50 (/member/PhillipH50/)

2017-03-12

Reply

I think what you should look into is tuning this simular curcuit to recieve in the frequency range of 7.83hz to 8.4hz. Because this is the earths magnetical resonance frequency. Tesla's paper state that 1 meter = 100v on a horizontal wire. So at 3 feet tuned into this frequency can produce 100v and at 6 feet produce 200v, ect..

About 10 years ago there was a video that was taken down of a Russian man who was demostrating his setup with a hand full of scientists. I don't remember all the details but one thing I do remember was that his antenna was 68 feet of 14 gauge copper wire hanging 6 feet above the ground horizontally. The ground stake was 1/2" rebar 6' into the ground.

You can look into these frequencies by searching "Schumann resonances are global electromagnetic resonances in the cavity formed between the earth's surface and the ionosphere. "

Just some of my thoughts..

tatebullrider (/member/tatebullrider/)

2017-02-09

Reply

Great instructable!! Just a quick question though. So the higher the antenna is in the atmosphere the better? And if so, you could (in theory) use a long thin wire attached to a kite or a weather balloon to temporarily generate more power, correct?

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ tatebullrider

(/member/tatebullrider/)

2017-02-09

Reply

You got it. You could use a kite or even a drone or quadcopter to take measurements at different altitudes. Post your data for us to see!

16me121lucifer (/member/16me121lucifer/)

2017-01-07

Reply

Sir i am getting 0.06v but negligible current. I am unable to light a LED. I wanted to know how can we connect similar circuits in series or parallel. I would be grateful if you upload a schematic diagram for the same.
Thank you.

16me121lucifer (/member/16me121lucifer/)

2017-01-02

Reply

Dear sir,
Can i use antenna of my old radio set to complete the given project?

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ 16me121lucifer

(/member/16me121lucifer/)

2017-01-02

Reply

Yes, you may. In fact, that is what it was designed for; you'll just using that energy for a different purpose. From there, the taller the antennae you use, the better the results.

Alijo0nn (/member/Alijo0nn/)

2016-12-30

Reply

Dear Paul

Is it possible that this circuit generates 1 ampera current with highest place of Antenna and suitable Earth?

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ Alijo0nn (/member/Alijo0nn/)

A single circuit, no. However, by running these circuits

2016-12-30

Reply

in parallel current can be increased to suit your output needs.

Thanks for checking out my Instructable and if you have any other questions feel free to let me know.

16me121lucifer (/member/16me121lucifer/)

2016-12-21

Reply

Sir can we light led with help of this project? & Can we do something so that the received energy is used only when we require? ie. something like switch?

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ 16me121lucifer

(/member/16me121lucifer/)

2016-12-21

Reply

Yes and yes. Give it a try and let us know how it works out.

Alijo0nn (/member/Alijo0nn/)

2016-12-16

Reply

Dear Pual

How can i connect some these circuits together?

is it work, if i connect 10 matched circuits to an antenna?

Best Regards

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ Alijo0nn (/member/Alijo0nn/)

You sure can. Give it a try and post your pictures for us to see.

2016-12-16 [Reply](#)

cmlucht (/member/cmlucht/)

2016-11-23 [Reply](#)

what if you hooked up some joule thief's low input higher output?

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ cmlucht (/member/cmlucht/)

Yes, try it.

2016-11-24 [Reply](#)

vvince (/member/vvince/)

2016-11-13 [Reply](#)

p.s

good ible all we need now is a nano amp amplifier

vvince (/member/vvince/)

2016-11-13 [Reply](#)

seems to me that thomask19 works for some big energy company who have suppressed ALL FREE ENERGY

egads man we cant have the minions getting ANYTHING free

there's no PROFIT in that



SHOE0007 (/member/SHOE0007/)

2016-11-07 [Reply](#)

I not trying to be rude but how do you get free energy from nothing? Unless you do this under a high voltage power line (very dangerous) i am not sure if this would work?

In state matter is neither created or destroyed so were is this energy coming from??

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ SHOE0007

(/member/SHOE0007/)

2016-11-07 [Reply](#)

Not at all and this is a very good question.

As Faraday and others have demonstrated, magnetic bodies in motion produce an electric charge. If you've ever used a magnetic compass, you know that the earth, along with orbiting bodies, are magnetic with a north and south pole. These moving bodies induce a charge in our atmosphere. This charge, with our new Crystal Energy Receiver, can be captured and harvested as usable energy.

Thanks for reading. Give it a try and be sure to follow and visit www.DrewPaulDesigns.com for more projects.

Brandonoutdoors (/member/Brandonoutdoors/)

2016-11-04

[Reply](#)

i like this "ible". I'm seeing a lot of negative comments though so I want lend my support to the author.

In no way is converting radio waves into electricity stealing. I mean think about it. When you turn on a radio to listen to music nobody bills you for the radio waves. They are paid for by ads.

With a homesteader in mind who may not live anywhere near transmission lines could use something like this at a larger scale (our planet is saturated in rf). when radio waves cross your property line they become yours to do with what you will (in my opinion). I say build (or buy) a large antenna and start experimenting with a larger scale.

cloethix (/member/cloethix/)

2016-08-02

[Reply](#)

good project

rah187 (/member/rah187/)

2016-07-22

[Reply](#)

Cool project! I have favorited this instructable and it is possible that I will eventually construct it. This circuit is actually very smaller to a few others I have seen on the internet, all of which produce around three volts. I have even seen people use crystal radio sets to generate electricity for LEDs. Of course, there are limitations to this setup, including the very low current and the fact that making this unit much larger than it already is may be considered illegal. The truth is, nobody would probably care about one device running off of the RF, seeing as seemingly innocuous grounded objects such as flagpoles can also "steal" radio waves. However, I am glad I read through the comments before making a gigantic fractal antennae and getting myself in trouble.

IlhamiA1 (/member/%C4%B0IlhamiA1/)

2016-07-18

[Reply](#)



Lolz its ??? Nano amperes and 0.06 v

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ IlhamiA1

(/member/%C4%B0IlhamiA1/)

2016-07-18

[Reply](#)

Eureka! You got it working! You now have proof of concept. Now it's time to increase your current.

First, try extending the antennae all the way to the highest point you can find (try your roof). Then connect a ground lead to the junction between your output terminals (between the two electrolytic caps in series) and run that to a piece of steel rod pressed into the dirt.

Once that is complete, you can optimize it even further! Now, with your antennae and ground set up start wiring in more circuits. Wire them in series, parallel or both according to your needs. Put all of the components on the same circuit board for a supersized version.

Thanks for checking out my 'ible! I hope this helps!

unbottled19208306 (/member/unbottled19208306/)

2016-07-10

[Reply](#)

When you say the 2 12 and 6 matched caps, do you mean 12 and 6 volt caps?

DrewPaulDesigns (/member/DrewPaulDesigns/) ▶ unbottled19208306

(/member/unbottled19208306/)

2016-07-11

Reply

The voltage capacity is variable, however it is important to use matching pairs of both ceramic and electrolytic capacitors. Thanks for checking out my project and let us know how yours comes out!

Arghus (/member/Arghus/)

2016-06-23

Reply

can u get it to 5v? for a usb port?

RowanS1 (/member/RowanS1/) ▶ Arghus (/member/Arghus/) 2016-07-01

Reply

yes its possible but current would be too low to be usable

RobertH7 (/member/RobertH7/)

2016-06-13

Reply

Congratulations! You built a full-wave rectifier! You passed the first chapter of basic electronics.

Unfortunately, this particular rectifier is an extraordinary waste of time. It produces a negligible amount of power. Your oscilloscope voltage reading is meaningless. Power is voltage TIMES current, and something like this will produce current in the range of nano-Amperes.

Just get some solar cells and call it a day. They absorb energy from the peak of the sun's blackbody radiation spectrum (which happens to be visible light), not in the negligible radio frequency range. The cheapest, least efficient solar cells out there will produce orders of magnitude more power.

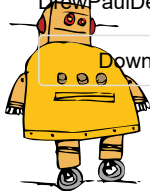
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